

CLIMATIC DATA SUPPORT INITIATIVE

Dr Rob Allan, Hadley Centre, Met Office

Royal Meteorological Society (RMS) History of Meteorology & Physical Oceanography Special Interest Group AGM 16th April 2005

PRESENTATION STRUCTURE

CLIMATE DATA SUPPORT PROPOSAL

• EXAMPLES OF ONGOING HADLEY CENTRE CLIMATE RESEARCH EFFORTS THAT WOULD BENEFIT FROM DATA SUPPORT

• INTERNATIONAL CLIMATE DATA INITIATIVES

QUESTIONS AND ANSWERS

CLIMATE DATA SUPPORT PROPOSAL (1)

- formation of a group of interested people who could provide co-ordinated support to climatic data researchers in the location, retrieval, digitisation, quality control and storage/archiving of historical instrumental meteorological and climatological data variables
- look to tap the potential knowledge and expertise of those who may already, for their own reasons and interests, undertake various levels of data archaeology looking to provide the scope and impetus for a co-ordinated approach to such ventures that benefits all

CLIMATE DATA SUPPORT PROPOSAL (2)

- a set of climatic data issues and needs could be compiled by the climate research community and provided to this body for assessment
- the support body would then liaise with the relevant research group(s) to determine what it could do to aid and support specific data issues and topics which would evolve through time as some items on it were addressed and others added, modified or subtracted
- would embrace a range of data needs from quite small and focused efforts on a particular site or region right through to providing support for a major data need

CLIMATE DATA SUPPORT PROPOSAL (3)

- data issues would not only include a wide range of material from the Met Office Library and Archives, but extend to say the Public Record Office at Kew, records from private observatories, National Trust houses, monasteries/priories, hospitals, lighthouses, harbours/ports etc it may extend to records at old colonial locations from say British Library holdings, and even to overseas UK consular records
- a number of questions need to be addressed as to how this type of group could be set up and run, plus the whole thorny issue of voluntary versus paid work

CLIMATE DATA SUPPORT PROPOSAL (4)

- may be possible to combine a core of voluntary with some measure of paid support, such as with any travel, access, copying costs etc or some appropriate recognition of the group's efforts
- if successful, a similar concept could be put to the International Commission on History of Meteorology (ICHM) with the potential to extend this initiative to one of truly international scope

EXAMPLES OF ONGOING HADLEY CENTRE CLIMATE RESEARCH EFFORTS THAT WOULD BENEFIT FROM DATA SUPPORT

EC-funded

European and North Atlantic daily to MULtidecadal climATE variability (EMULATE) Project

EMULATE Daily Mean Sea Level Pressure (MSLP) Data (1850-2003) Development

EMSLP1 to EMSLP3:

Terrestrial data Coverage

EC EMULATE Project Terrestrial Daily Pressure Stations 1850-1881 ■ 1881=> ■



EMSLP 1

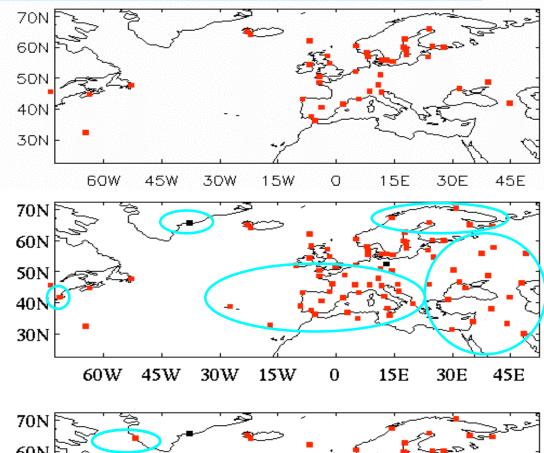
41 Stations

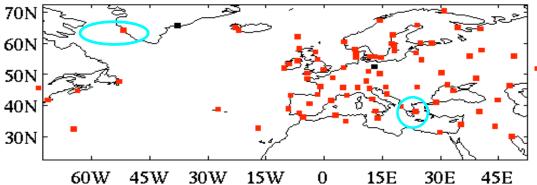
EMSLP 2

82 Stations

EMSLP 3

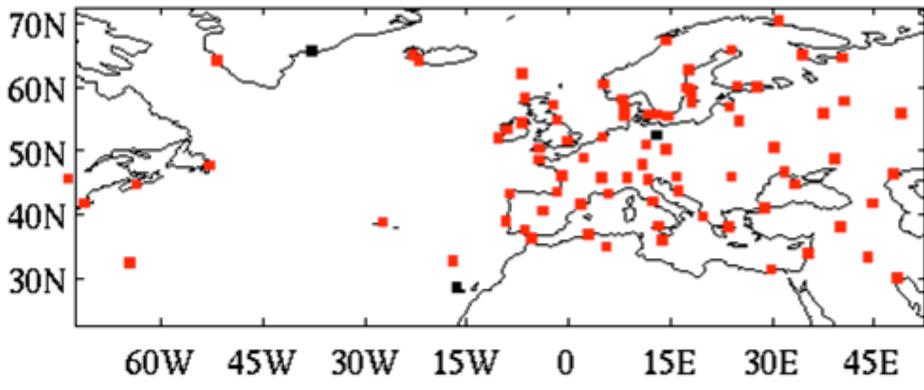
86 Stations





EMSLP3





- North Atlantic Europe daily MSLP product
- Blend of 86 stations + marine obs from 1850-2003
 - 5x5 degree resolution
- available Nov, 2005 from: www.cru.uea.ac.uk/emulate
 - see also: Ansell et al 2005

UK daily weather reports (from 1861): 3 January, 1868



IGHT A.M.		WEAT	HER R	EPORT	1	186%		
7i _ day			Force.	E	ktreme /	mary	3rd.	
Barometer.	Temp.	Wind.	1 to 12.	Force.	Direction.	Weather.	Rain.	Sea. 1 to 9.
Tairn 30:48 2	27	SE	1	1	E	enc 6		1
berdeen 30.46 Z	34	E	2	2	SE	50	0'02	6
eith 30.41 g	38	SE	1	2	E	25		2-
rdrossan 30 · 44 S	34	E	2	2	E	106		,
reencastle 30 · 40 2	37	E	2	1	SSE	oe		_
alencia 30. 27 2	38	ESE	3	7	ES E	00		5
ape Clear 30.23 2	38	_	3	4	E	c		3
oche's Point 30-23 f	35	E	5	6	E	0		4
iverpool 30 · 35 9	32	WSW	1	1	E	6	_	1
olyhead 30.30 2	33	ESE	1	3	ENE	e		_
enzance 30. 28 9	3/	ENE	. 4	5	NE	oeb		3
rest 30 · 16 s	30	SE	5	5	E	25		4
Orient 30.08 2	24	MNE	1	2	NE	6	_	2
ochefort 30.00 2	19	NE	2	3	NE	06		2

Page 12

French daily weather reports (from 1858, but only from 1869 in EMULATE: 3 January, 1875



de 8 du marin Dulletin International 300 3.

de l'Observatoire de Parix. 3 Danvier 1875

Stations	Baromet à vo etannia, O dela mer	te Diff Therm	oif	Pent	Elat du ciel	Etai de la mer	Pentrela veille a' 6 h du soir a' 9 h p Dueda	en e	l'arri-
Paris . Charleville	764.6 1	1.7 10.1		0 1/450 faible 50 mil	Convert id phue	eg	50 tr faible	0.8	11
Dunkerque Cap Gris ster	7647 -	1.4 8.6	The same of the sa	0so form	phue	houlouse	S to frible	0.3	10
Javalugue Le Harre. Cherbourg	767 5 1	0 7 7. 0 1 5 8. 0 1 3 10. 0	4.0	50 modera	Brunillard	gonlouse fonlouse Pen agitée	SE faible S moderie SO D	COLUMN TO THE	10 40 10
Prest Mathieu	769.1	3 4 10.2 3 5 10 0	2.2	So mul	Triadent	Gordonse	SO moderie		10
Le Groguen Re Greguen	768.7 2	2 3 10.0 2 8 10 0 3 0 5 0	5 0 5 c?	050 id	Convert Br. magoup Epaissa trume	a	OSO DO nul	10 '11 H	10 10 10
Rocheforn The daix	mi.8	0 0 3. 0 24 7. 0 05 5.0	20 25	SO faible	Browilland	Pen nguée	SU faible SE nul		10 10 10
13 onvenue 03 invite	. न् १ १	08 0.4	4.4	0 faible EsE pamel	Magens	agrice	O faible	95 94 11	10
Serpignan Ceue Marseille	()	0 5 5 0 0 0 0 5 2	00	No id	Benu P. nudyenoc	Pen agitée Welle	No faible	31 21	10

© Crown copyright

European daily MSLP charts from Algeria (from 1877): 31 December 1879



Stations	Barometre	de la mer	Thermo	onietres.	Direction	k force	Eta	1L		recueilla illim	Observations .
lu réseau Algerien	Observations	Difference en 84 heures	Observations	Difference on 84 houres	a 7 hdu matin	le plus fort des 84 heures	du Ciel	de la mer	er. 24 h	èemis le	ousertaums.
inours	772.H	_1.7	7.8	_ 1.2	E2	E 2	Cower!	tr belle		4.	
fan 'énez	"	"	"	. "	*	" "	"	belle	"	By	
lemeen	172.8	-1.2	3.5	-1.4	SE 44 Calme	NW 3	Convert	"	1.		
l-Aricha	170.0	2.0	2,0	+1.0	35W1	SSW 3	magens -	41	"		11
Saida	· ir	P			"		"	"	1"	-	"
	1	"	-08	* 15	SEI	SE 2	Courert	- 0	-	"	"
ap Caxme	772.1	-0.9	11.0	+2.0	Calme		Couvert	Calme	"	"	"
Orléansy dle	772.5	-1.0	1.0	+1.2	WSW1	WSW 3	Courert	Cathole	1	"	gelie Blanche
S! Cyprien	1770.1	- 11.71	1 "	70.0	1	11	"		-		nonparvenu
Aumale Tizi-Ouzou	772.2	_ 1.5	0.0	_0.5	Calme		Courert	fr fr	1 "	"	0 00 0
Fort-National.	774.9	-1.6	3.8	+4.6	Calme		Convert	"	"	"	geles Honege
Djelfa	174.1	-3.0	_3.8	+ 3.6	51	NW3	Couvert.	"	"	"	LOTE PAGE 1816
Laghorat	772.7	- 3.1				NW 1	Couvert	" "	1	4	"
Bourgie	471. A	1.4	1	1	1	W. 4	Couvert	belle.	1.	1,	Coujoure Curaire
La Calle	772.2	-2.0	8.0		WSW1+		mageure	Calme	4	11	"
Onelma	771.4	-2.8				W 3	Couvert		"	"	gelei Planche
Tebessa	772.5						Convert	4	1"	1	Grume -
Biskra	771.6	1					Convert			4	"
Tunis	172.8	1 /				WSW-S	Ermagens	e agitée			
Stax	773.5					SW4	mageria	belle-	"	,,	"
Malle	1"			"	1 .,		"	**	1,		**
		1				and the second second	rs D'EU	ROPE:	100000000000000000000000000000000000000		
Alger	Ville 1			Direct'	ents Tet Forces d	Etat in Ciel d	Etat i la mer		Vent		Etal Elat
Temperature (m			ilentia	0	3 0	75 M		d'Auc	W	. 12	urreux belle
des 24 heures Im			celly		-	ef		rritz	SW	2 0	week groose
Hamidité relative pro	nim. 15°3, 15.	D	unkerque	2000	11	4	, Tou	lon	NW		Pair Belle
les 24 heures Im	xim. 127	L.	e Havre herbouro			luie o		ourne	MMM		un gunse
Evaporation des	4 hter 1% of	3	Mathier					erine	SW	2 4	ungero Calme
	311				V 5. 18	THE WELL	20000		MME		want knew-buile
Silue	dien g	inerale					0				
		i i	.20	· jores	vion	atom	osposetio	ue of	fren	A. 4	evilé en
SWIP	a dejor	1.00 %	ster,	et	3 DA	jone.	ore nuclar	emmine.	00	CIACLE.	
100 630	on N	المناه	110	ama s	tate	une.	MONEYER	le Cais	.6 C	-Can	ométrique.
100	i de a	i Pli	MATA	ces	meris	la	bression	ve-se	tier	vi.	rers 772
0. 478	-3400	tout	le	rese	w.	Se ci	el est	coured	2 01	u true	ométrique, vers 712 o mageux
i de le	SCORAR.	1 x 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A COL	A UZ.PA	- LOUL						
		1 1			0.0	V 1975	eu, et	. 0	4	- 1	3 10 10 10 10 10 10 10 10 10 10 10 10 10

Ottoman records (from September 1869 - December 1874): October 1869



Réseau Météorologique Ottoman.

A 8 HEURES

	-	SMYRN	NE.			BEYRO	OUTH.		I	DIARBÉ	KIR.			BAGD	AD.			FAC).	
	BAR.	THER	VEN.		BAR	THER.	VEN.	AC	BAR.	THER.	VEN. A	c	BAR.	THER.	VEN.	AC	BAR.	THER.	VEN.	AC
1 2 3 4 5 6 7 8 9	62 0 61 0 62 0 60 0 60 0 63 0 60 0 60 0	$egin{array}{cccccccccccccccccccccccccccccccccccc$	S.E. S. S.E. S.E. E. S.E.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	60 60 59 58	1 27 4 26 3 4 25 0 26 3 26 3 24 0 28 0 28 0 28 0 24 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S 0 S 0 O 0 N 0 N 0 S 1 S 0 S 1 S 0 S 0 S 0 S 0 S 0 S 0 S 0 S 0 S 0 S 0	26 2	65 1 64 0 65 2 65 64 5 61 0 62 9 63 9 64 6	17 0 16 9 16 4 16 0 14 3 14 8 15 4	N.O. 0 O. 0 S.O. 0 S. 3		56 0 56 0 56 0 56 0 55 0 57 0 57 0	27 0 27 0 25 0 25 0 24 0	N. N. N. O. N.O.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
11 12 13 14 15 16 17 18 20	63 6	15 0 15 0 15 0 15 0 15 0 15 0 16 0 17 0	N. N. N. E. D.	300000000000000000000000000000000000000	62 61	6 21 5 20 5 21 5 22 5 22 6 22 7 23 6	N. 0 S.O. 0 S.O. 0 N. 0 N.E. 0 N. 2 N. 4 N. 6 N.E. 0 N. 6 N. 6 N. 6 N. 6 N. 6 N. 6 N. 6 N. 6		66 6 66 2 65 7 65 2 60 0 66 0 66 0	12 9 12 4 13 8 10 2 10 0 13 0	S.E. 1 N.E. 0		58 2 58 0 57 4 58 9 58 0 57 0 57 0 57 0	25 0 23 5 21 0 22 0 19 9 22 0 20 0 17 0	N.E.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	60 2 61 5 59 0 59 4 52 2 61 2	22 6 20 0 20 6		0 5 5
21 22 24 25 26 26 27 28 20 37	60 63 63 64 63 64 63	0 18 0 0 15 0 0 18 0 0 20 0 15 0 0 15 0 0 15 0 15 0 15 0 15 0 15	0 N. 0 E. 0 S. 0 E. 0 E. 0 E. 0 E. 0 E.	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	60 57 58 60 59 60 62 63 63 62	9 21 8 24 9 25 5 24 5 25 8 21 23 4 24 8 22	0 N. 2 1 N.O. 6 5 N.O. 4 5. 0 0 O. 6 4 O. 9 N. 6 5 N. 6	2	$\begin{array}{c} 67 & 0 \\ 66 & 0 \\ 65 & 4 \\ 68 & 3 \\ 68 & 7 \\ 63 & 4 \\ 67 & 9 \\ 69 & 9 \\ 69 & 0 \\ 67 & 0 \\ 66 & 0 \\ \hline 765 & 7 \\ \end{array}$	9 0 9 0 8 0 9 0 10 3 11 8 12 0 11 5 11 7	N.E. 0 N.O. 1 N.E. 0 O. 0 S. 1 N. 1 N. 1		57 5 57 0 56 3 60 0 61 0 60 0 61 0 61 2 59 5 51 0	17 0 20 0 20 0 17 0 20 0 19 0 21 0 19 0	N.E. N.E. S.E. O.E. N.E. S.O.	1 1 1 1 1 1 0	60 8 59 8 60 8 64 0 63 5 62 2 62 0	18 9 16 3 19 0 17 0 17 0 15 1	N.O. N. N.	1 2 2 2 0 0 0 4

A Kustendjé, le 8, tempête—A Varna, le 8, de 1 h. jusqu'à 5 112 du matin vent très-fort—A Nissa, le 6, pluie; le 7, la nuit vent très-fort; le 21, orage; le 28, la nuit, vent très-fort.—A Gallipoli, les 6 et 7, pluie; le 29, pluie abondante.—A Dardanelles, le 6, à 4 h. du matin faible secousse de tremblement de terre, direction du NE au SE—A Cavalla, le 6. pluie; le 26, le matin, orage, pluie, grêle.—A Salonique, le 5, le soir et le 6. le matin, coup de vent du NE—A Monastir, depuis le 6 jusqu'au 8, neige sur

US international weather records (1875-1888): 2nd August 1878



BULLETIN

OF

INTERNATIONAL METEOROLOGICAL OBSERVATIONS,

TAKEN SIMULTANEOUSLY ON AUGUST 2, 1878.

7:35_A. M. WASHINGTON mean time.

2:12 A. M. HONOLULU mean time.

6:7 A. M. MEXICO mean time.

7:7 A. M. SAN JOSE mean time.

7:25 A. M. TORONTO mean time.

9:2 A. M. PARAMARIBO mean time.

0:6 P. M. LISBON mean time.

0:28 P. M. MADRID mean time.

0:43 P. M. GREENWICH mean time,

0:53 P. M. PARIS mean time.

1:1 P. M. BRUSSELS mean time.

1:4 P. M. UTRECHT mean time.

1:13 P. M. BERNE mean time.

1:26 P. M. CHRISTIANIA mean time.

1:33 P. M. COPENHAGEN mean time.

1:33 P. M. ROME mean time.

1:37 P. M. BERLIN mean time.

1:49 P. M. VIENNA mean time.

1:55 P. M. STOCKHOLM mean time.

1:57 P. M. CAPE OF GOOD HOPE mean time.

2:18 P. M. ATHENS mean time.

2:39 P. M. CONSTANTINOPLE mean time.

2:44 P. M. ST. PETERSBURG mean time.

4:33 P. M. MAURITIUS mean time.

6:36 P. M. CALCUTTA mean time.

8:49 P. M. ZI-KA-WEI mean time.

10:2 P. M. TOKEI, (YEDDO,) mean time.

10:23 P. M. MELBOURNE mean time.

ALGERIAN SERIES.

Furnished by the coöperation of General Teissier, Commandant Supérieur du Génie in Algeria.

	BAROMETER. Corrected			ТЕМ		IVE ITY.		WI	ND.			C	LOUDS.			-FALL					
	m'trul	nstru- l error Reduced to tem-						THE AIR.		Direc-	Velocity.		Force.	Amount.		Direction.		SNOW IN THE PAST			
	pera		Marile .				田田	tion.			Fo	Up'er	Low'r	Upper.	Lower.	24 H	ours.		diameter 2		
STATIONS.	dente bine	ers.		ers.	eit.	le.		5.000	hour.	31.							īrs.	WEATHER.	OBSERVER.		
discourse a management	Inches.	Willimete	Inches.	Millimet	Fahrenheit.	Centigrade	Per cent.	From-	Miles per	Meters per second.)—10.	9—10.	0170	From-	From-	Inches,	Willimete				
ogađor	1041012		121113	1			1	California									1				
mours			90 80	750 9	81.5	27.5	54	IVW			4		1			0	0	Very fair	Dr. Ollive.		
ciers			29.76	755.9 756.4	83.5	28 6	63	N			4		5		annens enem	0	0	Cloudy	Touriliere.		
IIIS		and the second	90 91	757.8	85.3 77.0	29.6 25	68	William Co.		*******	1		6			0	0	Cloudy	Fourrede.		
X	War war war	The second second	90 00	760.2	87.8	31.0		ENE			3		7			0	0	Very cloudy			
da pessa		•••••	29.96	761.0	77.0	25.0		NNW			1		6			0.039	1.0	Cloudy	Herbin.		
[1VIII0			90 00	758.6	94.5	34.7	76	ESE			1		6				Inap	Cloudy	Watrin.		
				760.1	93.9	34.4		Calm			9		9			0.236	6.0	Covered			
A. C			29.85	758.2	93.2	34.0		SE			1		4			0	0	Fair	Chanyaux.		
North In the original														and the same of					Charletta.		

NOTE—In the originals the distinction between the amount of upper and lower clouds is apparently not made The weather is published as given. The rain-fall is measured at 7 a. m., local time. The elevation of Saida is 890? meters, or 2,919.9? feet; Tebessa, 1.088? m., or 3,569.4?ft.; Geriville, 1,360? m., or 4,461.7? ft.

EMSLP1 to EMSLP3:

Terrestrial data

Gaps and Discrepancies

Hudson's Bay Company territory 1821 to 1870 Met Office Greenland Alaska 1802-Fort Chimo Hudson Bay Fort Chipewyan York Factory Pacific Ocean Comberland East Main Factory Edmonton Fort Victori Fort-Ruper Vancouver Fort William Atlantic Ocean Columbia CANADA Meteorological stations Page 18

Hudson's Bay Company journals



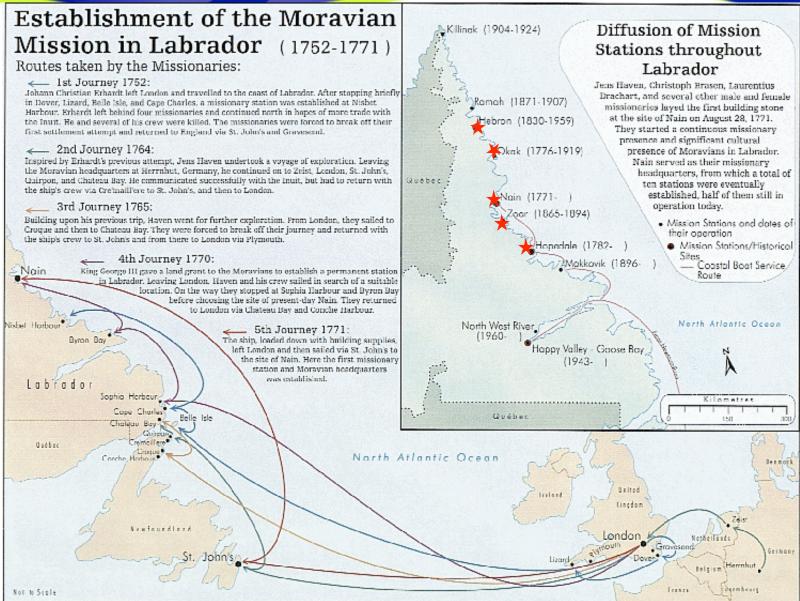


© Crown copy

Source: http://www.gov.mb.ca/chc/archives/hbca/

Moravian missionary meteorological stations





Greenland data situation

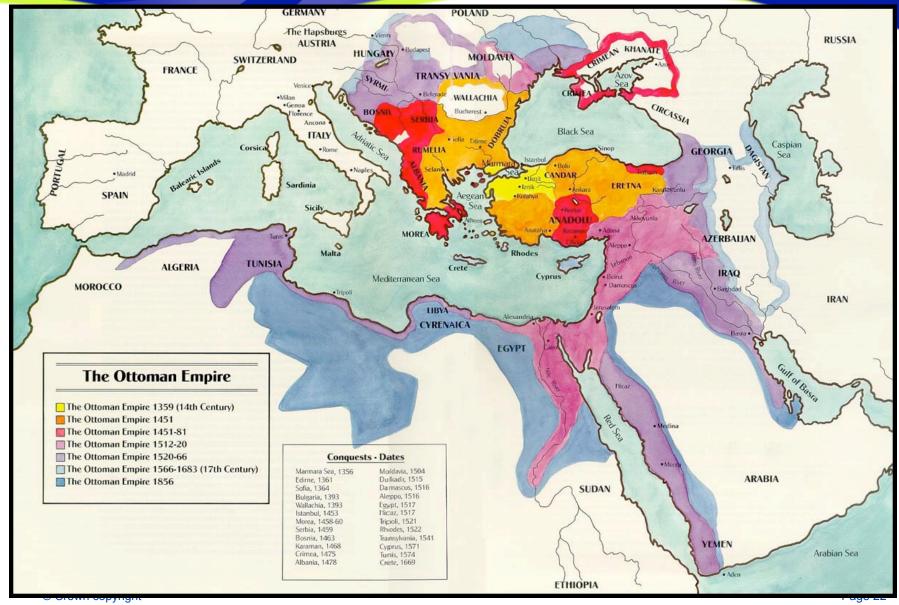




© Crown copyrigh

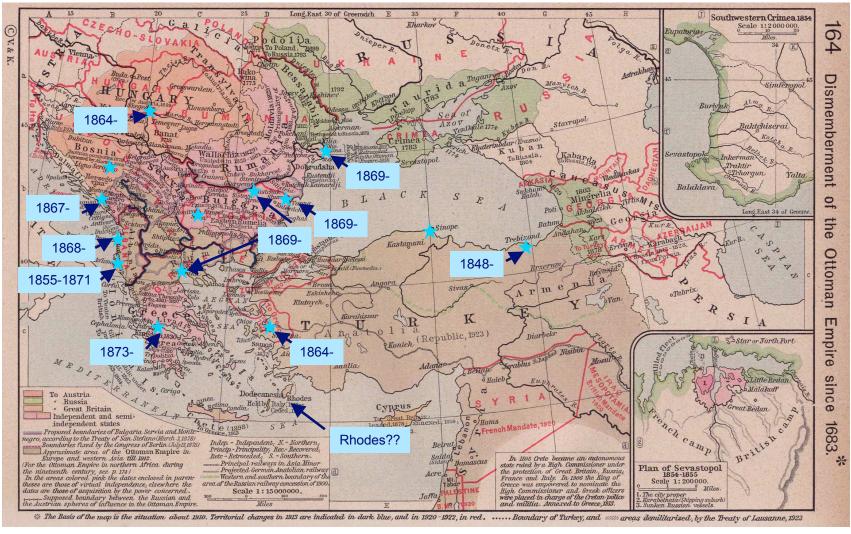
The extent of the Ottoman Empire





Break up of the Ottoman Empire





Ottoman Archives





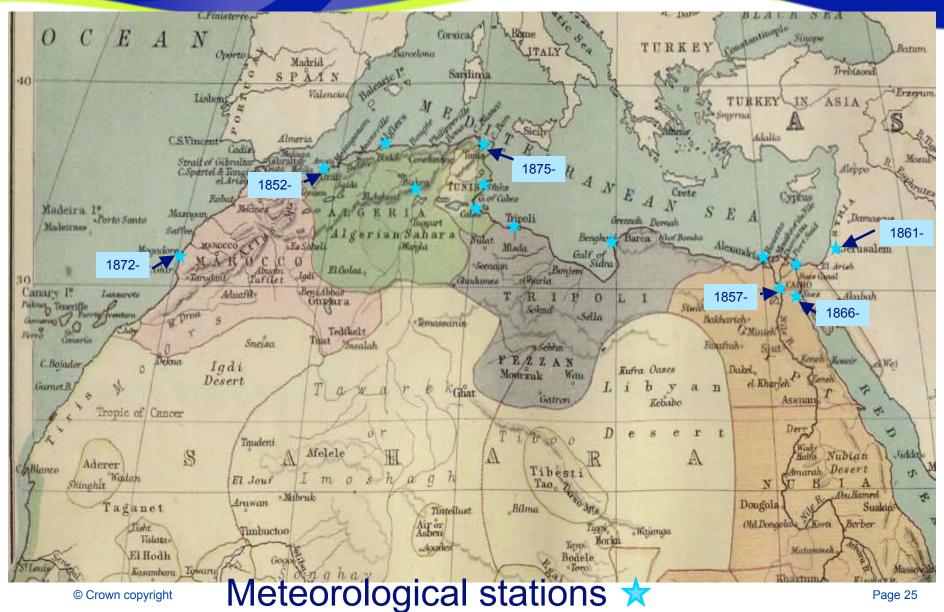




http://www.devletarsivleri.gov.tr/

Colonial North Africa (Long records back into the 19th Century)





GMSLP2.1f to HadSLP3

Monthly Historical Gridded Mean Sea Level Pressure (MSLP) Development

Hadley Centre's globally-complete historical gridded monthly MSLP data products (GMSLP =>

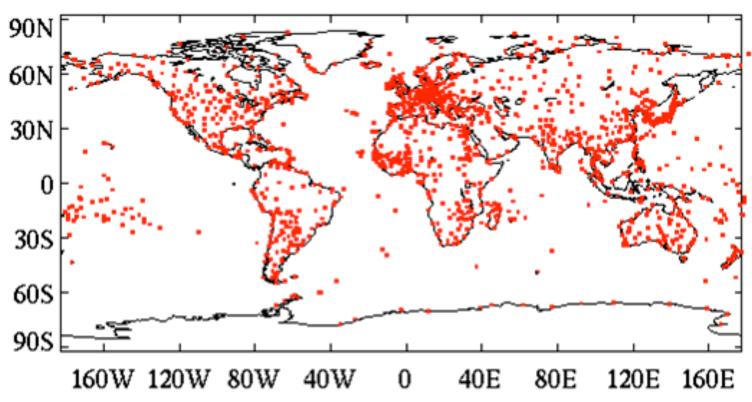


- GMSLP2.1f (1871-1994)
- HadSLP1 (1871-1998)
- HadSLP2 (1850-2003)
- HadSLP2r (1850-present) updated in real time
- HadSLP3 (1850-present)
- HadSLP3r (1850-present) updated in real Soon to be available from www.hadobs.org (contact: tara.ansell@metoffice.gov.uk)

© Crown copyright

HadSLP2: Distribution of terrestrial monthly MSLP stations





- Global, monthly product (update of HadSLP1)
- Blend of 1502 stations + marine obs from 1850-2003
 - 5x5 degree resolution
 - will be updated in near real time
 - HadSLP3 will be created by the end of 2005

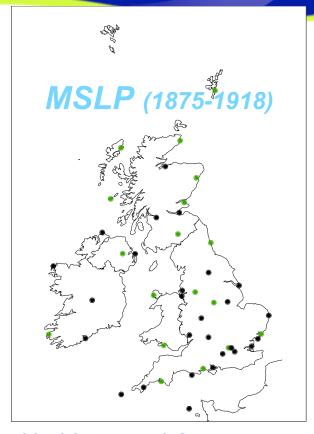
Historical UK Daily and Sub-Daily Digitisation Project

MSLP, Precipitation and Surface Temperature

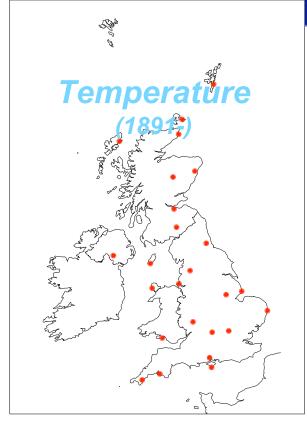
(Lisa Alexander)

DEFRA funded (£200,000) UK daily and sub-daily data digitisation: Spatial distribution





Precipitation



18508 pages/sheets

18 stations ~ 30 million characters (large overhead)

All stations ~ 55 million characters
© Crown copyright

826 years ~ 200,000 characters

534 years ~ 1.5 million characters

Source: Lisa Alexander

Example Data Format: Daily Weather Report



r wk	o 4.	RITIS	STI											T	H	E	DA	AIL	YV	VE	ATE	IER	F	EP
		CTI					0	FI	HI		M	ET	CE	0	RO	DI	00	FIC	AL	OF	FIC	CE.	AI	R
			(DBSE	RV	ATI	ON	S at	r h							obe			1		SER			
			et is	i .:	= .	Win	ad.	- 43		- i	1	1				Toud.			1		Win	8.		
DISTRICT	STATIO	vs.	Height abov	Marom Marom	Change 3 hours	(8) Direc.	0—12		luel °F.	2) % Humi	A Dew Po	Visibili	Low.	Med	High	Low 0-10	Tota 0-10		mb.	Change 8 hours	Direc.	6-12	Weather	Tour Je
1	London ()	Kew)	18	#	40	(3)	(4)	(5)	55		(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	+(4	(18)	(19)	(20)	(21) (2
	Croydon S. Farnbo Boacombo Thorney Lympne Manston	Down	290 226 417 10 283 154	14.6 14.1 14.0 13.2 14.8	-2 +2 +0 +4 -2 -2	5 55E 5'E 5'W 5E 5	2 2 2 1	roro e/d Zo roro	57 55 52 58 57	92 92 97 97	55 52 57 57	0 0 7 0	56666	2 7 2 2		4-6 2-3 2-3 4-6 7-8	10	3000 2500 300 2500	16.2 15.8 15.6 15.9	+12 +16 +14 +18 +14	55W 55E 55W	0	zo b-bc fg fgr	53 5 53 5 53 5 54 5 54 5
2	Shoebury Felixstow Gorleston Mildenha	е	11 12 5 15	14.9	+2 -2 -2	55E 55W 5E'E	222	Zo C	57 59 59	92	57 57 53	60	5 5 5	7	-	2-3	3+	1500	14.7	+10 +6 +4	พรพ รผ่พ พรพ		0,5000	55 5 54 9 55 9 55 9
	Cranwell		203	14.2	+2	SSE	2	20	50		50		5	2	_	4-6	10		14.1	+8 +G	SW'S	3	Zo Zo	55 3
3 4	Birmingh Upper He Ross-on-V	Vye	535 408 223	13-6	+2	-201 	0	20	51	32	49	6	-	1	-	0	10	-	14.8 15.1	+10	55 W 5	2 1	Z p	48 9 50 9
5	Hartland Bristol	Point	209	11-6	+6	SSW	3	6-ba		92	51	8	5	4	-	3	2-3	2500	14-8	+20	55W	3 <	:-bc	54 9
	Portland Plymouth The Lizar Seilly (St. Guernsey	d	32 82 240	12-7	+6+6	5 5 55 W 5 W '5	4032	20 b-ba	53	92	51 57 52 51	6	55285	7 - 4	01011	7r 7r 2-3 2-3		2500 3000 2500	15.2	+20 +22 +16	55W	0 1	fg be be	49 8 59 8 46 9 53 8 52 8
6 7 8	Pembroke Holyhead Chester(Se	(Valley)	142 32 16 235	08.7		5W 5 E5E	643	bc roro	56 56 53	85 92 85	52 53 49	7	3	6 - 7			4-G 7-8	3000 1500 2500	13.4	+20 +22 +2	5W 5 5W 5	S	-be e :-be	56 7 54 9
_	Spurn He Catteriek Tynemou	ad	29 175 108	12.1	+2 0 -2	SE SE S	3 3	c Zo	55	35 32 37	48 52 50	7 7 5	4 5	3		2-3 2-3 9+	3+	2500		+6	SSW	3	bc Z	51 5
11	St. Abbs		280	12.3	-4	5	4	c-bc			50		5	-	-	7-8	7-2			-2	520	3 -	bof bop	50 9
2	Leuchars Renfrew (A) Eskdalem	bbots I.)	36 19 794	09.4	+2 -2 -6	SE SSE E'S	3	20 c-b	50 52 2 51	85	48 48 47	767	5	4 4 7	8 2		2-3	-	08.4 08.4 08.4	-2 +8	55E 5	2	o m	48 9 51 8 52 9 50 9
34	Point of A	yre	30	07.7	0	SW'S	5	e-be	54	57	52	=7	6	2	-	7-8			10-4	+20	w's	3	c	52 9
3B	Sternowa Dalwhinn Aberdeen	e	80 1176 79	03.0		SSE	4 6	c-bo	55	85	49	8	85	3		-0.	7-8	2500	07-2	+6	55W 55W	3		53 9 54 8 48 8
6	Wiek Sumburg		114	08.3	+6	SW	4 5	be lo	51	85	47	ファ	5 5	3	-	7-8 4-6	4-6	3000	07.8	+2	S'W SS€ S'E	4 5	20	52 3 51 3 52 3
	Blacksod Malin Hei		18	06.2		WN	3	c-bc	53	92	51	8	5	5	-	2-3	97-8	2500	07-2		SW	3 4	G-10C	54 8
	Aldergrov	е	268		+6	5E	2	c-be			49	8	8	6	-	2-3		3000			w'5 5W			54 8
10	Birr Castle Valentia (Roches Po	bay.	173 30 22		+14	w w's	3	c/pr bc	51	92		3	55	-	- 5		9+	1500 2500	12.6	4193	SSW S'E	8	c .	47 85 48 93 49 9
							Abri	dged ob	servat	tions	of a	eddia	ions	i ste				AVIATI			HER C			400
	Sh. G.M.T.3					WNC	011	WVhN	IST OC	0000	C	07h	G.N	A.T.	121						18h. G.M			01h. G.1
9 5	2 61627	12.328	60 8	5865	8 000	068	06	02690	1536	4 5	- 0	8184	2 -	484	14	338 334		2754		86	81944		-	-
03			57	0295	3 12	126 :		0284-5				284		1642		340		02856		23	01863	10153	- 53	0278
0 5		07368	67	2285	4 127	266 :		05667		5	3	018	62	162	13	136 386	70	10754	الحملط	57	02844	1422	8 51	0275
1 01		0002		01863	1		g - :	25856	20. 2	6 8		373		1815		368	23 6	25653	5326	21	05662	1332		0849
15 0		12168	_				_	05664				566		1631		368	2- 6	2655	4865	20	02853	19426	53	0176
10 S	2 0565	0002	3 46	1766	4 07			05666			- 0	286	2	1811	- 11	390 5		5545		57	05561	12325	4	6145
9 1		12222	4			-		25846				584	-	2139		882 8	-	2764	12326	22	02862		A	0269
8 2	7 02755	12325	53	0562		416		01790		-		056		203	H	438 &	80 2	2854 2564 2555		87 17 23	02853	1421	52	6264
75 8	6 817.46	08387	5-				53 6	2755	16128	5.	4 0	0(82	4	243		III								
01 2		16424	59	0566	14	313 5	7 6	2654	14-4-68	80	0 2	1565	9- 6	836	25	h. N		Index N	umber o	f Static	on See I er See I low cloud See Intr in cloud	nder Cl	mert. 133	Introdit

Historical Global Sea-Ice Initiative

(Nick Rayner)

Hadley Centre Global Sea Ice and Sea Surface Temperature (HadlSST) Data Set



- Global sea ice and SST fields for 1870 onwards
- We have various sources of sea ice in the Arctic enabling us to make credible analyses of sea ice variations here back to the late C19th
- However, no monthly varying sea ice data for the Antarctic are included in HadISST1 prior to 1973 and there is little likelihood of this without significant data archaeology and digitisation

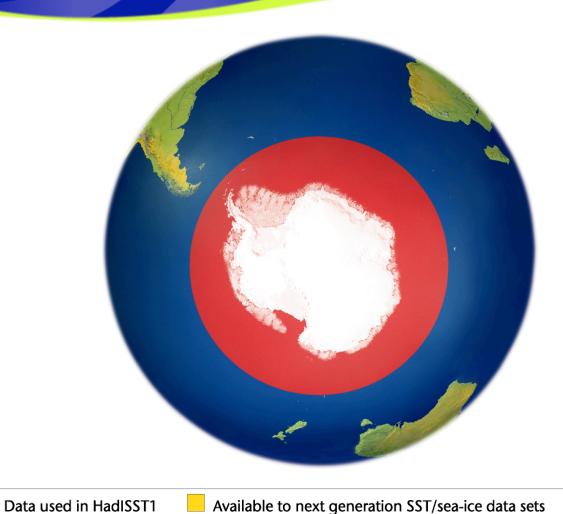
© Crown copyright Page 33

Sea ice data availability: mid C19th - 1900

No data



Possible future data source



© Crown copyright Page 34

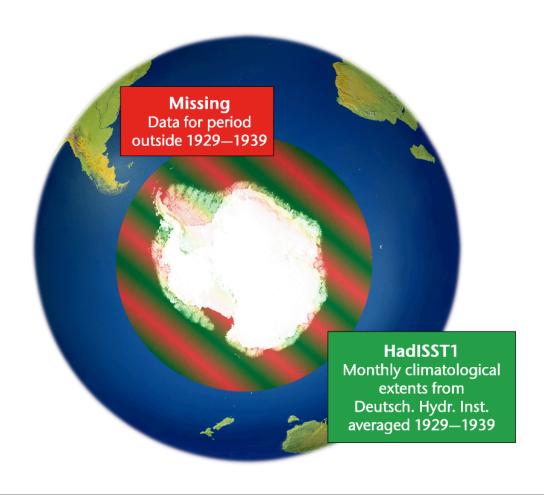
Sea ice data availability: 1901-1950

No data

Data used in HadISST1



Possible future data source



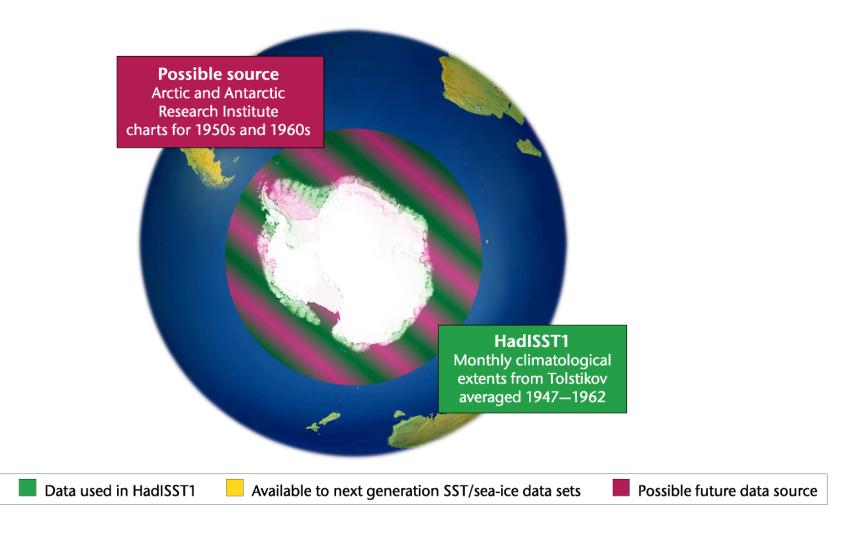
© Crown copyright Page 35

Available to next generation SST/sea-ice data sets

Sea ice data availability: 1951-1970

No data



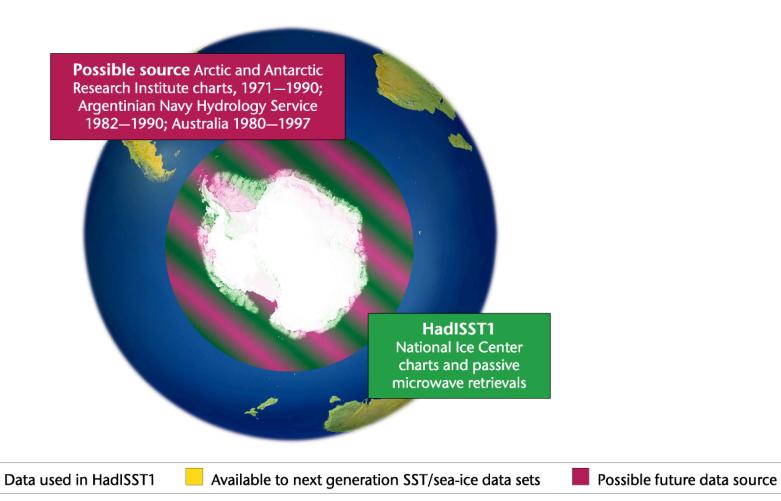


© Crown copyright Page 36

Sea ice data availability: 1971-present

No data





© Crown copyright Page 37

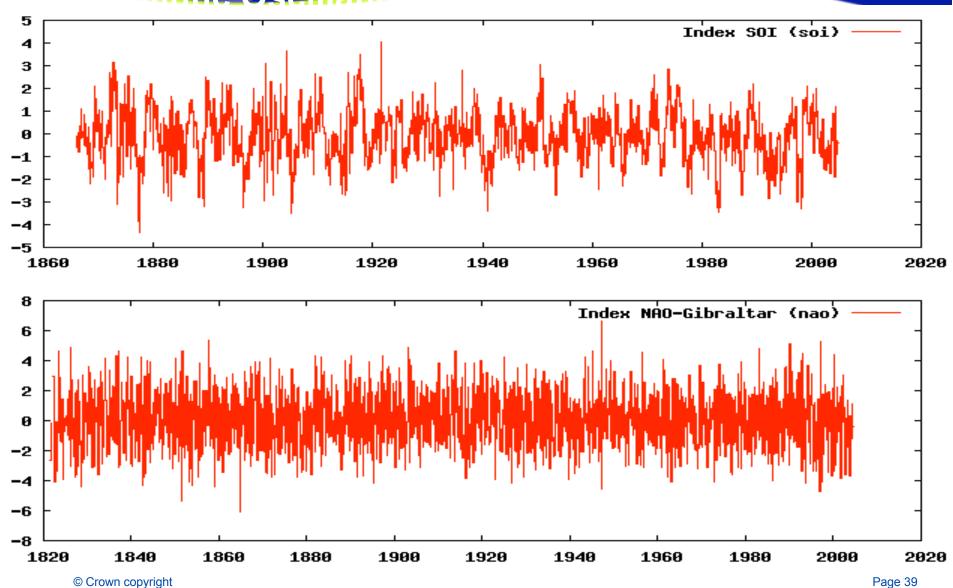
Extending Long Historical Data Series

MSLP Station Records and Indices

Long climate Indices (e.g. Southern Oscillation [SOI]

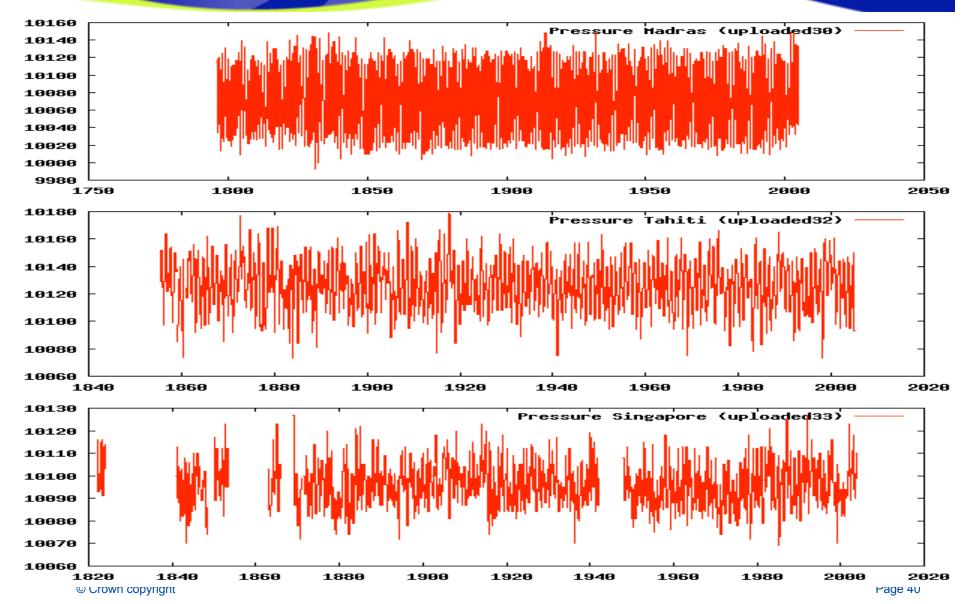


antic Oscillation



Long station MSLP records (e.g. Madras, Tahiti and Singapore)













Climatological Database for the World's Oceans 1750-1850

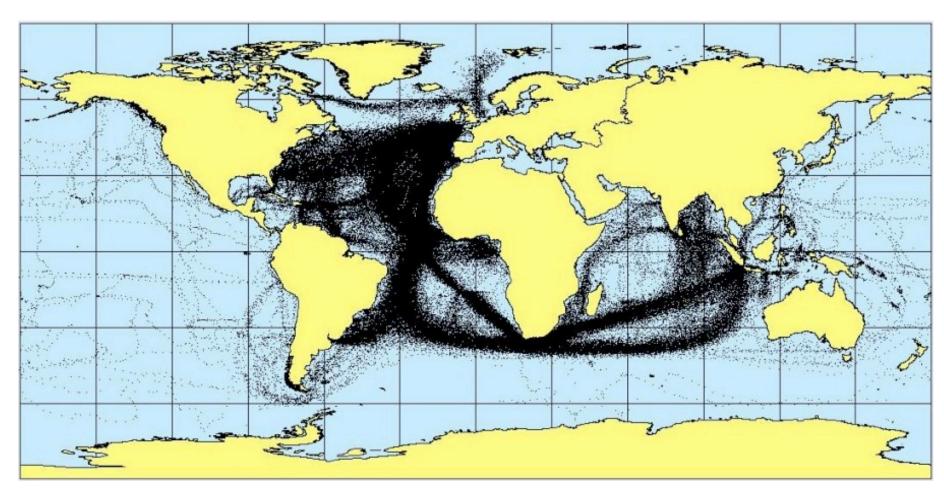
An European Union funded project (2001-2003)

The CLIWOC release 1.5 is currently available from CD. Copies can be freely obtained upon request at rgarciah@fis.ucm.es

© Crown copyright Page 42

Positions of all ship observations in the CLIWOC database: 1750-1854





Source: http://www.knmi.nl/cliwoc/

UK marine data digitisation initiative: Ship logbooks





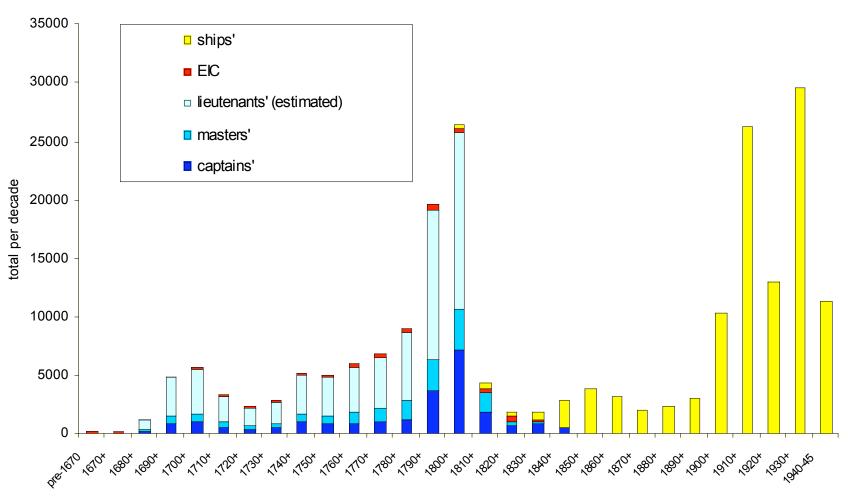
The National Climate Data Center (NCDC) in the US can (more or less) guarantee \$300,000 for digitising logbook data. But the UK partners need to provide the logbook images from which this can be done: there's no question of shipping the originals to the US, and their funds can't be spent over here, save for \$75,000 earmarked for a specialist team leader knowledgeable in archive management etc.

A proposal has been put to DEFRA to seek funding for the imaging of the UK logbooks for this initiative. Images would then be sent to NCDC in the US for digitising.

Dennis Wheeler, Philip Brohan & Simon Tett

UK logbook availability by decades from 1680 to 1945 (5% digitised up to 1830)



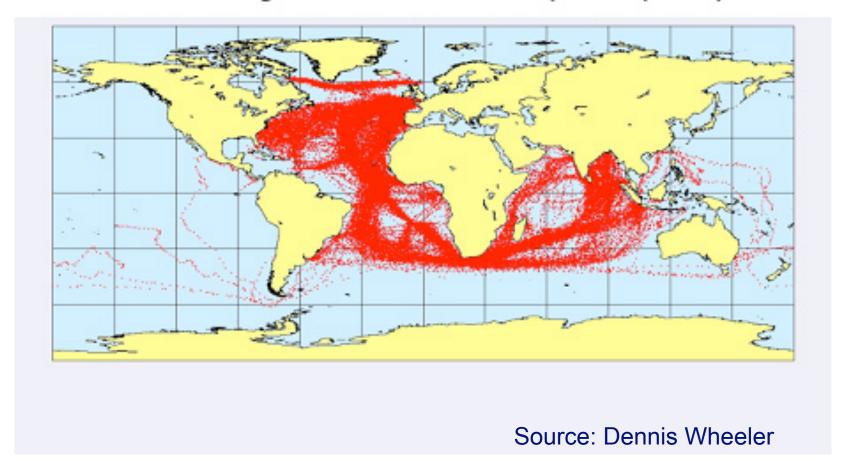


Source: Dennis Wheeler

Distribution of data points from UK logbooks used in CLIWOC



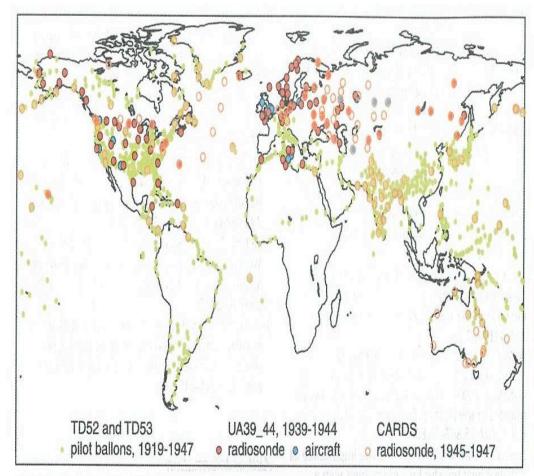
UK coverage: 10% exhaustion (of daily obs)

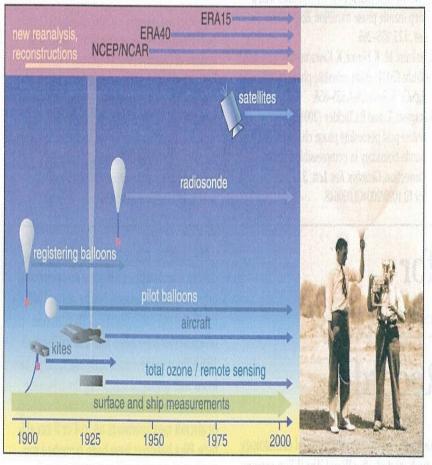


© Crown copyright

Extending the 20th Century Climate record: Upper Air Data



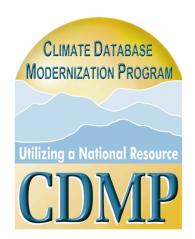




Source: Bronnimann, S., Compo, G. P., Sardeshmukh, P. D., Jenne, R., Sterin, A., 2005: New approaches for extending the 20th century climate record. *Eos*, 1(67),

2-7. © Crown copyright Page 47





CDMP

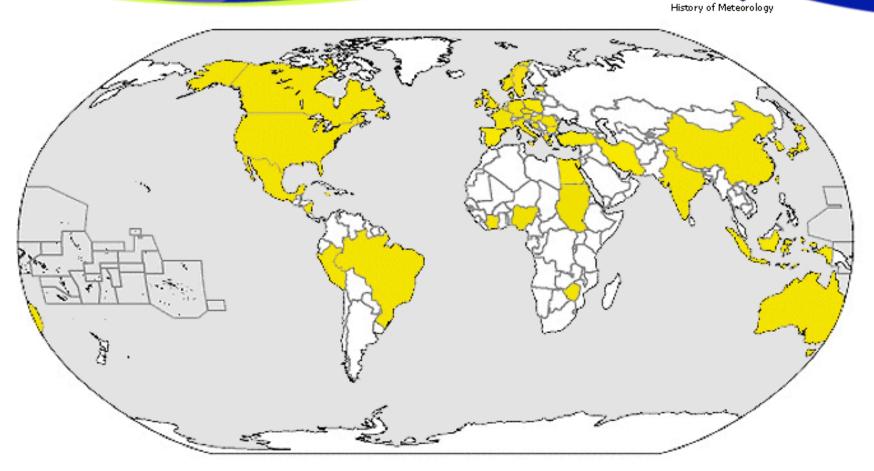
Climate Database Modernization Program of the National Climatic Data Center (NCDC)

The CDMP is a partnership between NCDC and private industry to image and key paper and microfilm records and to make them available on the Web to members of the climatological research community. Currently there are nearly 42 million images available through contractor developed software. NCDC also provides funding under CDMP for other NOAA agencies with a need to place Source: http://www.ncdc.fioda.gov/oa/climate/cdmp/cdmp.html

© Crown copyright Page 48

International Commission on History of ICHM Meteorology (ICHM)





The ICHM has 223 members from 43 nations (world map of member nations)

Source: http://www.colby.edu/ichm/

QUESTIONS AND ANSWERS